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ABSTRACT

In the 21st century, VIVOs (voice-in/voice-out computers using visual displays but no text) will make written language obsolete. Written language is essentially a technology created 6,000 to 10,000 years ago for storing and retrieving information. VIVOs will perform this same function more easily, efficiently, and universally without requiring people to learn to read and write. There will be no compelling reason for schools to teach literacy skills. By 2050, the electronically-developed nations will become oral cultures; by 2150, a worldwide oral culture will be in place. Today's push to develop VIVOs is a further step in the human evolutionary drive to move past written language's limits and return to the biogenetic, oral-aural, pre-alphabetic roots of human communication and information storage. Young people's choosing television, telephone, stereo, and computer games over books, letter-writing--and the resulting literary crisis that engulfs schools--is not the result of mental laziness or poor schools, but is an irreversible symptom of this deeper evolutionary process. VIVOs will transform every area of human activity in the 21st century, including education, the arts, human relations, politics, and business. Billions of nonliterate people, using VIVOs, will finally be able to access the world's stored information--if they can gain access to VIVOs. Access to VIVO technology looms as a key human rights issue of the 21st Century. (Author/AEF)

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CompSpeak 2050: How Talking Computers Will Recreate an Oral Culture by Mid-21st Century

By:

William Crossman

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Abstract: CompSpeak 2050: How Talking Computers Will Change Teaching and Learning in the 21st Century, William Crossman

In the 21st Century, VIVOs (voice-in/voice-out computers using visual displays but no text) will make written language obsolete. Written language is essentially a technology created 6,000 to 10,000 years ago for storing and retrieving information. VIVOs will perform this same function more easily, efficiently, and universally without requiring people to learn to read and write. There will be no compelling reason for schools to teach literacy skills. By 2050, the electronically-developed nations will become oral cultures; by 2150, a worldwide oral culture will be in place. Today's push to develop VIVOs is a further step in the human evolutionary drive to move past written language's limits and return to the biogenetic, oral-aural, pre-alphabetic roots of human communication and information storage. Young people's choosing TV, telephone, stereo, and computer games over books, letter-writing, etc.--and the resulting literacy crisis that engulfs our schools--is not the result of mental laziness or poor schools, but is an irreversible symptom of this deeper evolutionary process. VIVOs will transform every area of human activity in the 21st Century, including education, the arts, human relations, politics, and business. Billions of nonliterate people, using VIVOs, will finally be able to access the world's stored information--if they can gain access to VIVOs. Access to VIVO technology looms as a key human rights issue of the 21st Century. **Contact author: <willcross@aol.com>**

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William Crossman received his B.A. in philosophy from Cornell University, his M.A. in philosophy from Harvard University, and continued his study of philosophy and linguistics at The Massachusetts Institute of Technology. From 1989 to 1997, he taught philosophy, critical thinking, and writing at Morris Brown College, an historically Black college in Atlanta. Now teaching at Vista Community College in Berkeley CA, he is also a published poet, an organizer in the anti-racism and pro-human rights movements, and an accomplished jazz pianist. The author has lived and worked in Boston, New York, Los Angeles, Atlanta, and the San Francisco Bay Area. **Phone: 510-839-5691; <willcross@aol.com>**

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(This article is a slightly revised version of Chapter 1 of the author's forthcoming book, also entitled CompSpeak 2050: How Talking Computers Will Recreate an Oral Culture by Mid-21st Century.) Contact author: **<willcross@aol.com>**

The 20th Century is behind us, the new millennium has arrived, and, in the United States:

*most people would rather talk to someone on the telephone than write to them;

*most people would rather watch TV than read a book;

*most schools and most school children are engulfed in a deep literacy crisis, with little hope for a breakthrough.

Why is all this happening now? Superficial explanations--such as blaming it on people's mental laziness or backwardness, on TV, or on the schools--simply won't do. Something much deeper, and more difficult to see, is going on.

The growing feelings of alienation from writing and reading, which school children and people of all ages are experiencing and expressing through their day-to-day behavior, are signs and symptoms of a profound historical, social, technological, and evolutionary change. They are symptomatic of a massive shift that is taking place: away from the use of written language and back to the use of

spoken language to communicate, store, and retrieve information in our daily lives.

In the United States and other electronically-developed countries, we're witnessing nothing less than the abandonment of reading and writing, of written language itself, and, in its place, the recreation of oral culture. The push to develop voice-recognition technology and VIVOs--Voice-In/Voice-Out computers that we can talk to and that can talk back to us--is part of this evolutionary leap.

It truly is evolutionary. Historically, before our human ancestors developed written language, they accessed stored information orally-aurally, by speaking and listening--as well as by seeing, smelling, tasting, and touching. They relied on their memories to store information that they heard--as well as saw, smelled, tasted, and touched--and they retrieved it for others by speaking and acting.

Six thousand to 10,000 years ago, people's memories were no longer efficient and reliable enough to store and retrieve the influx of new information that arose with the onset of the agricultural revolution. To transcend their memories' limits, our ancestors came up with a remarkable solution: written language.

It was a feat that required great imagination and complexity of thought and, in today's terms, involved the creation of: new software--pictographs and alphabets forming written languages; new hardware or the adaptation

of old hardware to new tasks--pens, pencils, brushes, knives, inks, chalk, pigments, animal skins, paper, leaves, wood, stone; and new operations--writing and reading. Using this new technology, our ancestors freed themselves from the limits of human memory. Written language enabled them to freeze and thaw as much information as their hardware allowed.

Today, we in the electronically-developed countries view writing and reading as one of the necessities of human existence, as something we can't do without, like water, food, and sleep. This may be the view we see through our culturally-biased, pro-text eyeglasses, but it's just plain wrong. Not only is written language not necessary to human existence, but we could have reached today's level of information storage-retrieval without ever having created written language in the first place.

If some early society had found or carved a wooden, bone, or stone cylinder, coated it with beeswax, attached a porcupine quill to a hollow gourd, let the quill rest on the wax-coated cylinder, and spoken into the gourd while rotating the cylinder, written language might never have happened.

Humanity might have gone right from storing and retrieving speech-based information by memory to doing it by phonograph without entering the world of print culture at all. Humanity's First Golden Age of oral culture might never have ended.

I'm overdramatizing this point somewhat to help lay the groundwork for a different view of written language. Throughout this article, I characterize written language as a technology, a technological solution to specific information-storage-retrieval problems that people faced at a specific moment in history 6,000 to 10,000 years ago. Like most technologies, written language will serve its function until some better technology comes along to replace it. Written language isn't an eternal verity. We can admire it, but we shouldn't worship it.

With written language about to make its exit, and its replacement already stepping through our front door, it is vital that we see written language clearly for what it is: a transitory technology. This reality-check will help us prepare ourselves to say "goodbye" to it and to welcome back its replacement: our old friend, spoken language.

Unlike written language, spoken language--by which I mean speech itself--wasn't/isn't a technology devised by people to overcome human limitations in the face of social and environmental changes. In this sense, spoken language isn't a technology at all. Though we humans created or devised particular spoken languages, we didn't create or devise spoken language itself any more than we created our circulatory systems.

Our ability to speak language, period, is an inborn characteristic of our species. We carry in our genes and our brains the capacity for spoken language. If the day

ever arrives that we wave a final "goodbye" to spoken language--and to the sign languages used by people with hearing and/or speaking disabilities--we'll be waving "goodbye" to the species of human beings that we are.

In contrast to written language, spoken and sign language is "user friendly." As very young children, we just start understanding it and speaking or signing it. We don't have to spend years in school learning to speak. Nor does spoken language drive a wedge into the world's population the way written language does--dividing humanity into those who can read and write and those who can't. Everyone who is mentally and physically able can speak a language.

Historically, spoken language came--and had to come--to humans before written language. Biologically, speech or sign language comes--and has to come--to each child before literacy. This is because written languages are symbolic representations of spoken languages. Had we no spoken language, we could not have created written language. Written language may have emerged as the primary method used to store and retrieve information in certain areas of the world, but it is based on and derived from spoken language.

In the 21st Century, people with access to VIVO-computer technology will once again be able to use spoken language to access all stored information. Talking computers are going to make writing, reading, spelling,

alphabets, punctuation, written numerals, music notation, and all other notational systems obsolete.

The obituary for written language won't be written. It will be spoken by someone talking to a VIVO computer in 2050.

Since the mid-19th Century, humanity has been waging a furious assault against written language. This has taken the form of people--particularly North Americans and Europeans--inventing and developing devices which use spoken language, rather than written language, to communicate, store, and retrieve information. A cornucopia of speech-based devices now exists which has simplified and sped up--and/or completely redefined--the tasks we formerly assigned to text and text-based devices. For the past 125 years, in North America, Europe, and Japan, these speech-based devices have been relentlessly usurping the functions of the text-based devices.

The letter, the magazine, the newspaper, the broadside, the book, the flyer, the written advertisement, the memo or written message, the file, the written record, the official document, the written school exercise--all have come under attack. In some cases, direct or instantaneous oral-aural communication devices (telephone, telegraph, live radio, live television) have been doing the usurping. In other cases, devices which store information in the form of speech (phonograph, audiocassette, "talkie" movie film, videocassette) have been responsible.

Since 1990, our minds and resources have turned to the development of talking computers. In our rush to create VIVOs, we're continuing the process Edison, Morse, Tesla, Bell, and their counterparts began.

E-mail appears to be an exception to the above: a form of written message whose popularity is surging in the electronically-developed countries. I predict, however, that the moment we're linked together by VIVOs--a moment merely several years away--most of us will stop typing our messages and will start speaking them again.

Why have we been so obsessed with researching and developing oral-aural replacements for written language? Because biologically, psychologically, and technologically, we have again hit limits on the efficiency and reliability of our main method for freezing and thawing information.

Formerly, as I mentioned above, it was the limits of human memory to retain the influx of information during the agricultural revolution that led people to create written language. For the last 125 years, it has been the *limits of written language use* that have driven people to seek and develop oral-aural replacements. I'll return to these limits in a moment.

Even though the scientific sector has been working overtime these past 125 years to develop oral-aural and non-text visual technologies, from the wax-cylinder phonograph to the talking computer, the true nature of this process and its goal--to supersede written language's

limits by returning to oral-aural methods of information communication and storage--has been largely *undeclared, unacknowledged, and unconscious*, even among the chief developers themselves.

This article has, as one of its main objectives, to acknowledge this process and to raise it to the level of consciousness and awareness. If we understand what is happening and why, we'll be better able to evaluate it and direct its course.

VIVOs will be the last nail in written language's coffin. By making it possible for us to access stored information orally-aurally, talking computers will finally make it possible for us to replace all written language with spoken language. Once again, we'll be able to store and retrieve information simply by talking and listening--and by looking, too, but at graphics, not at text. With this giant step forward into the past, we're about to recreate oral culture on a more efficient and reliable technological foundation.

From a Darwinian perspective, written language is a 6,000-to-10,000-year-old bridge that humanity has been using to walk from our First Golden Age of oral culture to our Second. We undertook this journey to survive as a species. Six thousand to 10,000 years ago, lacking the ability to store and retrieve by memory the growing sum of survival information, our species faced two options:

develop new storage-retrieval technology or self-destruct. That's when and why we created the written-language bridge.

As a species, humans have instinctively understood that any systematic failure in our ability to store and retrieve information is a threat to our survival. Now, we in the print-literate nations are instinctively reacting to the fact that written language--our stored-information accessor of choice--has hit its limits and is failing us.

It is failing us, first, because it is no longer able to do the tasks we created it to do and, second, because too many people are unable to use it. An example of the first: for most literate people, communicating, storing, and retrieving information by writing and reading is still far slower and more tedious than doing it by speaking.

Regarding the second, it's sufficient to remind ourselves that the great majority of the world's people, by conservative estimates 80% of humanity, including many living in the so-called print-literate nations, still can't use written language effectively. Most societies in the world today are still oral cultures, and very few of the world's societies--including the United States--possess either the enormous human and economic resources and/or the political will required to fully train their populations to write and read.

There's another reason--also related to evolution and natural selection--that we're leaving written language behind. In carrying out the historical commitment that we,

in the print-literate societies, had made to written language, we have--largely unaware of our dangerous path--strayed too far away from our innate information-communication-storage-retrieval method: speech.

Our genes, nervous systems, muscles, and emotions have been sending us a crisis wake-up call, reminding us of our spoken-language survival mandate and telling us to return to our oral-aural roots, or else. Or else what? Or else the speech-deficiency-based physical and mental illnesses--similar in many ways to sun-, motion-, sleep-, and vitamin-deficiency illnesses--that began to strike the print-literate nations in the 19th Century and that have become an epidemic in the late-20th Century, will continue to spread unchecked.

Since the late-1800s, we in the print-literate nations have been acting swiftly and positively--though mainly unconsciously--to avert this health crisis. We've been heeding the evolutionary mandate of our human physiology and psychology to reverse the widening gap between our present print-oriented selves and our innate, biogenetic, oral-aural selves. It seems clear to me now that the steps we have been taking to stem this epidemic include phasing out writing and reading entirely and phasing in speech-based devices including talking computers.

On some unconscious mental level, we seem to understand or believe that talking computers will help us to achieve the wellness and wholeness we seek. We seem to

unconsciously understand that hooking ourselves up to these talking-computer I.V. units--IntraVIVOs?--will rid us of textual toxicity and pump us full of lifesaving orality. I am overdramatizing again, but only a bit.

Located at the far end of the written-language bridge, the Second Golden Age of oral culture has been visible to us since the invention of the phonograph in 1877. We've trekked the bridge toward our destination decade after decade through the 20th Century. By mid-21st Century, we will have finally reached the bridge's end and stepped off into the future. Once across, we will never look back.

School children's declining literacy rate is a symptom of these deeper processes. As a group, young people in the electronically-developed countries have chosen oral-aural and non-print visual technologies--video, stereo, radio, film, telephone, and computer--as their preferred methods for accessing "live" and stored information.

These technologies, like written language, are external extensions of our brains' memory banks and our sense organs--mindparts located outside of our heads. But unlike written language, they allow us to communicate in the way that's most basic and familiar to us: through spoken language.

Most young people today instinctively understand this rock-bottomness of speech/spoken language. They are in touch with it. They feel it in their bones, their brains, their genes. Why should they read and write, so many young

people ask, when they can listen and speak? They view the rules of writing as they view all rules imposed on them by adult society--as devices to dominate and control young people. And they're rebelling.

Students' refusal to go along with the program is causing our schools to develop a record of failure, as each twelfth-, eighth-, or third-grade class graduates with a weaker grasp of reading and writing than the prior year's twelfth-, eighth-, or third-grade class. Writing teachers are feeling discouraged and demoralized, and many have basically given up trying to teach it. The result: a downward spiral of writing-reading skills and test scores that has become the school literacy crisis of the 1990s.

By 2050, if large numbers of students have been able to gain access to talking computers, all this negativity and failure concerning writing and reading will be a distant memory. All education in the electronically-developed countries will be oral-aural and non-text visual. Students will use talking computers with optional monitors displaying icons, graphics, and visuals to freeze and thaw information.

Instead of the "three R's"--reading, 'riting, and 'rithmetic--students will focus on the "four C's"--critical thinking, creative thinking, compspeak, and calculators. I call it VIVOlutionary learning.

We won't have to wait until 2050. By *2005*, a student assigned to write an essay will be able to speak it into a

VIVO computer, use VIVO's grammar-check to organize and correct it, "proofread" it by listening to VIVO repeat it, print it out, and submit it to the teacher for a grade.

The student will have proven two things. First, that any person--nonliterate as well as literate--with a talking computer will be able to produce a perfect written essay. Second, that *because* any person with a talking computer will be able to produce a perfect written essay, written language will have become obsolete.

Why should the student in the above example bother to print out a copy of the essay? Why should they bother with that final step of translating their spoken ideas into written language? Their teacher certainly doesn't need a written record of their ideas. Using their own VIVO, the teacher will be able to listen to the student's spoken ideas online and respond accordingly. Neither the student nor the teacher needs to write anything down in order for learning to occur and for education to take place.

In this scenario, the student and teacher are using their VIVOs exactly the way VIVOs are supposed to be used. Isn't that why we're developing VIVOs? Isn't that what they're for? Don't we *want* students to be able to input their ideas orally online and teachers to be able to access those ideas aurally? Voice-in, voice-out: simple.

We developed written language to store and retrieve information, and we are developing talking computers to perform the very same function. Because talking computers

will do it more easily, quickly, efficiently, universally, and (ultimately) cheaply, they will replace written language. Simple.

We used to cut our grass with a scythe; then, we invented the push lawn mower and put the scythe in a museum; then, we invented the gasoline-engine lawn mower and put the push lawn mower in the museum. That's the way technology works, and the way we work with technology: we are forever replacing the old with the new.

In the case of written language, however, we are replacing a technology (written language) with a non-technology (spoken language), but we are giving the non-technology a new technological twist: an electronic echo, a gigantic memory capable of storing and retrieving an almost unlimited amount of information in the form of speech.

Written language was a technology created by our ancestors to help them deal with a specific set of historical needs and conditions in a specific historical period several thousand years ago. Today, we are creating VIVO technology to answer a different set of needs and conditions in our own historical period. Soon we'll be placing written language on the museum wall next to the scythe.

Just as some students today might join a choral group, karate club, or chess club as a pleasurable pastime, some mid-21st-Century students might join a literacy club to

learn written language for fun. But there will be no compelling reason why they would need to learn to read and write and, therefore, no compelling reason why they should have to learn it--or why their schools should have to teach it. Exit the school literacy crisis.

Not only education but the arts and, possibly, international relations will be transformed in the shift from print to oral culture.

Imagine the literary arts without written language, and the musical arts without written music: a return to story*telling*, spoken poetry, and improvised music.

Imagine international relations without written language: dominant nations would no longer be able to force other nations to read and write in the former's "standard" languages--a traditional weapon of cultural domination--and would no longer be able to decide which individuals, in the dominated nations, would be allowed to become literate.

These are just two examples of areas in which VIVOs, or more accurately, people using VIVOs, will reshape the world in the 21st Century. In this article, I take the viewpoint that *good* results *could possibly* come from the fact that talking computers will soon take over written language's job. Lovers of the written word--and I am one of you--I invite you to give the following ideas a hearing.

The creation of VIVOs will create new *potential opportunities* for people in three areas.

*** VIVOs will create new *potential opportunities* for the world's nonliterate and semi-literate people to be able to access--through speech or signing alone--the world's storehouse of information and knowledge. For the first time since the introduction of written language, people's nonliteracy or semi-literacy won't prevent their accessing all stored information.

Pre-VIVO electronic technologies have already actualized similar potential opportunities for millions, maybe billions, of people worldwide. Within a period of about sixty years, a huge amount of information that had been formerly inaccessible, because it had been stored in the form of written language, has become available to people who can't write or read. Radio, video, stereo, film, telephone, and computer have opened up an oral-aural and/or non-text visual universe of stored information for the non-readers and non-writers who have finally been able to gain access to these technologies.

Sixty years isn't a long time. The very existence of written language on Earth for sixty-hundred years or more has profoundly affected and reshaped all cultures and communities--even those that are still oral cultures. Now, even before VIVOs sprout from our wrists and lapels, radio, video, and the rest have been busily, and irreversibly, reshaping global reality once more.

*** VIVOs will create new *potential opportunities* for all people, whether literate or not, to instantaneously

communicate *in all languages* with other speakers or information storage units. Using today's "old-fashioned" text-entry computers and text-translator software, a person can communicate in writing with another person who reads and writes another language. The problem is that both people must already be able to read, write, and enter text in at least one language, their own.

Using VIVOs, we won't need to know how to read or write, won't need to be verbally fluent in any language other than our own native language, and won't even need to understand a universal language like Esperanto. VIVO units will allow people around the world to speak easily with one another in their respective native languages, thanks to VIVO's simultaneous speech translation function. Electronic Esperanto!

*** VIVOs will create new *potential opportunities* to access stored information for many people who can speak and hear, or sign and see, but whose physical and/or mental disabilities make it difficult or impossible for them to write and/or read.

In these last three asterisked sections, I've italicized the words "potential opportunity" with good reason. The most that *the birth* of a new technology can possibly achieve is to open potential opportunities for people. These opportunities can only become actualized when people actually gain access to the technology and utilize it.

Here's a familiar example. Since most people in the world can speak and hear, they have the ability to use the telephone. But most of the world's people don't have access to telephones because of the high cost of service and/or the unavailability of service in their communities. The invention of the telephone has opened up the *potential opportunity* for everyone to speak across long distances, but using a telephone remains out of reach for the billions of people who haven't been able to get their hands on one.

The birth of a new technology, by itself, can't change anything. People having access to and using the new technology can create change and make history.

For the foreseeable future, which includes the VIVO Age of the 21st Century, the issue will continue to be: who controls the new technology and, therefore, who controls whom. As with all technology, talking-computer hardware and software will be developed, patented, copyrighted, programmed, manufactured, encrypted, sold, bought, leased, used, distributed, and shared--or not shared--by those with the wealth and resources to control these processes.

In my opinion, it would be great if all the nonliterate and semi-literate people around the world could actually start using VIVOs on January 1, 2010 to access the world's databanks. But it would be naive to think this will happen automatically just because the technology itself will exist on January 1, 2010. If people want

access to talking computers, if we want to actualize the potential opportunities VIVO technology presents to us, we've got to figure out how to do it...and then do it.

The right to have access to the stored information, the collective knowledge, of our community, our society, and our world is a human right. The ability to read and write, print-literacy, is still the key that opens these information vaults. Yet, billions of people around the world are being denied access to this information because they remain nonliterate or semi-literate. Most of the world's people still haven't received their keys. Literacy has historically been treated as a privilege, rather than a right, by those who hold the master keys--and it's as true today as ever.

Most people in the world haven't even seen a library. If they were able to travel to a library, and if they were able to find its door open to them--for many libraries' doors would not be--they would still find the meanings of the sentences in the books on the library's shelves closed to them.

In this article, I say some negative-sounding things about writing and reading. For example, I say that they are about to become obsolete. This isn't intended as an attack on written language. It's merely an observation, part of a broader analysis presented here. And it's definitely not intended as an attack on, or a demeaning of,

people worldwide who are striving to learn to write and read.

I have the greatest respect and admiration for children and adults around the world who are trying to achieve literacy. Today, a person's ability to write and read still raises for them new possibilities of communication, knowledge, social and political involvement, employment, enjoyment, self-esteem, creative expression, and much more.

The analysis presented here, rather than closing the doors of hope on those who lack and/or seek the literacy-key to information, communication, and knowledge, opens these doors wide for them. It says that the same VIVO-computer technology that will make written language obsolete will also create potential opportunities for the billions of nonliterate and semi-literate people throughout the world to tap into the world's store of information--without having to learn to read and write at all.

To all students and all others who wish to read and write, I still say: Go to school! Stay in school! Learn to read and write! We'll need it in our lifetimes!

I say this because written language isn't going to disappear overnight. It will take time: decades, two or three generations, maybe even a whole century. Yet, its eventual disappearance will be the end of a process that's already well underway.

It is ironic that, with the 21st Century's arrival, oral culture is growing in the print-saturated, electronically-developed countries at the exact moment that many electronically-undeveloped countries are earnestly launching literacy campaigns. The near-future course of literacy development in these latter countries is very difficult to predict. However, in the United States today, we need only to look around to confirm that a massive, rapid, electronically-aided decline in the number of writers-readers has begun.

We're witnessing the beginning of an earthshaking transformation of human society away from print culture toward oral culture. It will occupy and involve the energies of humankind from the beginning to the end of the 21st Century and will surely reshape every field of human activity. By 2050, in the United States and the other electronically-developed countries, the use of written language, of writing and reading, will mainly be a thing of the past.

One hundred years beyond, by 2150, all of the world's communities will again be oral cultures. VIVOs will link all of them--including those we build in space--into a single, oral-aural, information-access network: a true, worldwide oral culture.

There is a book, yet to be written, titled *The Future*, that is already *out-of-print*.

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